POSTERS

TCT-780

Accuracy of Intracardiac Echocardiography for Aortic Root Assessment in Patients Candidated to Transcatheter Aortic Valve Implantation

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Background: To date, although no "gold standard" tool for aortic root measurement has been defined yet, multislice computed tomography (MSCT) appeared to be the most accurate instrument to reach this goal. On the other hand, the MSCT has the drawback of having to administer contrast dye, which might be unsafe in transcatheter aortic valve implantation (TAVI) patients frequently affected by vary degree of chronic renal failure. We sought to appraise the accuracy of intracardiac echocardiography (ICE) in the measurements of aortic root compared with MSCT, in patients candidated to TAVI.
Methods: Annulus and sinus of Valsalva diameters were measured using ICE, performed during standard invasive preprocedural assessment in 30 consecutive patients with severe aortic stenosis referred for TAVI. All the measurement were made off line on the same images by two experienced operators. MSCT was performed in all patients afterwards and aortic root measurements were made by an independent specialized radiologist.
Results: Effective ICE measurements were obtained in all patients, easily and without any complication. Mean aortic annulus diameters were 21.9±1.8 mm using ICE, 22.0±1.8 mm and 22.8±1.8 mm using MSCT (3-chambers [3-C] view) and MSCT (mean long axis/short axis [L-ax/S-ax] views), respectively (p=0.073, ICE vs 3-C MSCT; p<0.001, ICE vs L-ax/S-ax MSCT). Correlation between ICE and both MSCT measurements was good. Mean sinus of Valsalva diameters were 32.3±3.3 mm using ICE, and 32.5±3.1 mm using 3-C MSCT view (p=0.141). Even in this case, correlation between ICE and both MSCT measurements was excellent. In all cases maximum discrepancy between measurements was low. 0.33±0.6 mm and 0.13±0.6 mm, for annulus and sinus of Valsalva, respectively.
Conclusion: patients referred for TAVI, measurements of the aortic annulus and the sinus of Valsalva using ICE compare favorably with those made at MSCT. This approach might be an useful and reproducible strategy in patients with severe renal impairment to avoid the administration of contrast dye during MSCT.

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3D Multislice Computed Tomography To Predict Annulus Plane Angulation And C-arm Positioning in patients referred for TAVI: Benefit On Safety Procedural Outcome

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Background: Positioning the X-ray tube C-arm perpendicular to the aortic annulus plane is key to achieve an appropriate delivery of the Edwards-SAPIEN valve during TAVI. This step requires performing angiographies in different angulations of the C-arm. We hypothesized that 3 D analysis of pre-procedural CT scan could be used to define the plane of the aortic annulus plane, the corresponding C-arm angulations, and could improve the safety outcome of the procedure.
Methods: All patients referred for TAVI in our center undergo CT scan as part of the preprocedural screening. A dedicated 3D analysis using a software updated to define aortic annulus plane and the corresponding c-arm positioning (3mensio Valves softwareTM) was performed in 37 consecutive patients; retrospectively in 23 and prospectively in 14. The retrospective cohort was used to validate the method. The predictive value and the benefit were tested in the prospective cohort using the last 14 patients of the retrospective cohort as controls.
Results: In the retrospective cohort we demonstrated 1) a very good intraobserver (23/23, Kappa = 1) and interobsever (22/23, Kappa =0.91) reproducibility and a very good accuracy (22/23, Kappa =0.91) of 3D CT analysis in defining the aortic plane angulation by comparison with X-ray; 3) heterogeneity of the orientation of the aortic plane from patient to patient with a range of 70° in the cranio/caudal axis and 80° in the right/left axis. In the prospective cohort pre-intervention 3D analysis of the CT allowed us to predict the position of the C-arm in 13/14 (93%) of the cases. By comparison with controls, 3D analysis of the CT aortic plane was associated with a decrease of the duration of the implantation phase by 36% (25±7 vs 39±14 min, p=0.001), X-ray exposure by 50% (804±519 vs 1611±1058 mGray, p=0.01), amount of contrast media by 50% (103±36 vs 207±98 ml, p=0.01) and post procedural creatinine rise by 63% (21±49 vs 57±71 µmol/l, p=0.01).
Conclusion: 3D analysis of pre-implantation CT predicts accurately the angulation of the aortic annulus and the corresponding C-arm position of the X-ray tube required for TAVI. Such an approach improves key safety parameters such as the duration of the implant, X-ray exposure, amount of contrast media and kidney toxicity.

TCT-782

Timing and Potential Mechanisms of New Conduction Abnormalities During the Implantation of the Medtronic CoreValve System In Patients With Aortic Stenosis

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Background: New-onset left bundle branch block (LBBB) and complete atrioventricular block (AV3B) frequently occur following transcatheter aortic valve implantation (TAVI). We sought to determine the timing and potential mechanisms of new conduction abnormalities (CA) during TAVI using the Medtronic-CoreValve System (MCS).
Methods: 65 consecutive patients underwent TAVI with continuous 12-lead ECG analysis. New CA were defined by the occurrence of LBBB, RBBB and/or AV3B after the following predefined time points: (1) crossing of valve with stiff wire, (2) positioning of balloon catheter in aortic annulus, (3) balloon valvuloplasty, (4) positioning of MCS in left ventricular outflow tract (LVOT), (5) expansion of MCS, (6) removal of all catheters.
Results: A new CA occurred during TAVI in 48 patients (74%) and after TAVI in 5 (8%). Of the 48 patients with procedural CA, a single new CA occurred in 43 patients (90%) and two types of CA in 5 (10%). A new LBBB was seen in 40 patients (83%), AV3B in 9 (19%) and RBBB in 4 (8%). The new CA first occurred - in descending order of frequency - after balloon valvuloplasty in 22 patients (46%), MCS expansion in 14 (29%), MCS positioning in 6 (12%), positioning of balloon catheter in 3 (6%), wire crossing of aortic valve in 2 (4%) and after catheter removal in 1 patient (2%). Patients who developed a new CA during balloon valvuloplasty had a significantly higher balloon/annulus ratio than those who did not (1.10 ± 0.10 vs. 1.03 ± 0.11, p=0.030). No such relationship was found with valve/annulus ratio.
Conclusion: TAVI with the MCS was associated with new CA in 82% of which more than half occurred before the actual valve implantation. It remains to be elucidated by dedicated studies whether new CA can be reduced by appropriate balloon sizing. A precept that also holds for valve size given the observed directional signal of the valve size/aortic annulus ratio.

TCT-783

TRANS-AORTIC ACCESS FOR TRANSCATHETER AORTIC VALVES IMPLANTATION: SINGLE CENTRE EXPERIENCE

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Background: Transcatheter aortic valve implantation has been designed to treat high risk for surgery elderly patients affected by severe aortic stenosis, however these patients are also often affected by severe iliac-femoral arteriopathy, rendering the trans-femoral approach unemployable.
Methods: From May 2008 to April 2011, 200 patients were evaluated for TAVI at our center. One hundred and five patients (50 male) with severe symptomatic aortic stenosis and no reasonable surgical option, mean age 82±8 years, were eligible for CoreValve (102 patients) or Edwards (three patients) percutaneous femoral implantation. Eighteen patients underwent CoreValve implantation directly from the ascending aorta through a right mini-thoracotomy, patients' characteristics are reported in Table I. Procedures were performed by a combined team of cardiologists, cardiac surgeons and anesthetists.
Results: Procedural success was obtained in seventeen cases, one patient died due to abdominal aorta aneurysm rupture. All other patients were discharged in asymptomatic status, with mid-term good prosthesis performance. One patient was converted to femoral approach due to an extremely fragile aortic wall, one patient experienced left ventricle tear successfully surgically treated. All discharged patients improved their NYHA functional class and functional capacity and echocardiograms evidenced good valve performance at two years. One patient died during follow-up for cachexia.

TABLE I	Nr	% or SD
Male	9	50%
Mean Age (years)	81	7
Peripheral Vasculopathy	18	100%
Diabetes	3	16%
ReDo	4	22%
Chronic Renal Failure	10	55%
Peak Ao Δ (mmHg)	92	23
Left Ventricular Ejection Fraction	57	11%
Euroscore Logistic	11	3
STS Mortality	11	6%
Implant Time (min)	160	90
Post-implant Ao insuff ≤ 1	16	89%
PM implant	3	16%
Hospital Stay (days)	11	4

Conclusion: TAVI with direct aortic approach seems safe and feasible also in redo patients offering a new attractive option to treat selected high-risk patients with severe aortic stenosis and peripheral vasculopathy, and emerged as a valuable alternative to trans-apical procedures

TCT-784

Multi-Slice Computed Tomography: a New Gold Standard for Valve Sizing and Prevention of Aortic Regurgitation in Patients Referred forTranscatheter Aortic Valve Implantation?

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Background: Moderate to massive aortic regurgitation (AR) is occurring in 30% of cases after TAVI. Pre-procedural assessment of aortic annulus diameter is key for appropriate sizing of the prosthesis and prevention of AR. Transoesophageal echocardiography (TEE) is currently the method of choice in this setting. The value of multi-slice computed tomography (MSCT) is unknown.
Methods: In 70 consecutive patients, implantation of the SAPIEN XT prosthesis was performed using TEE as recommended: 1) When annulus was > 24.5mm the procedure was not performed; 2) The cut-off point of 21.5m was used to choose between a 23mm or a 26mm prosthesis. Annulus diameter by MSCT was measured in all patients pre-procedural. For each modality, TEE and MSCT, the "sizing index" was defined as the ratio "prosthesis diameter/annulus diameter". Aortic regurgitation was evaluated by echocardiography performed at discharge and graded as: 0=none/trace, 1=mild, 2=moderate, 3=severe and 4=massive.
Results: Moderate-to-massive AR was observed in 20/70 (28%) patients, including 6/70 (8.5%) with a severe/massive AR. Annulus diameter was significantly larger by MSCT than by TEE (25.3±2.7vs 22.4±1.9, p=0.001). A significant but weak correlation was found between these 2 measurements (r=0.42; p=0.001). No significant correlation was found between annulus diameter by TEE and the degree of AR or between the "sizing index" by TEE and AR. A significant and inverse correlation was found between annulus diameter by MSCT and the degree of AR (R=0.51; p=0.001). The inverse correlation between the "sizing index" by MSCT and AR was higher (R=0.62; p=0.0001). In the 17 patients with a "sizing index" by MSCT≤1; 6 had a moderate AR (35%) and 6 had a severe/massive AR (35%). In the 53 patients with a "sizing index" by MSCT >1; 8 had a moderate AR (15%) and none had severe/massive AR (0%). The difference was highly significant (p=0.0001).
Conclusion: Once patients with a very large annulus by TEE (>24.5mm) have been excluded, TEE is of no use to predict AR after TAVI. By contrast MSCT has a good ability to predict such complication. In addition our analysis suggests that a simple approach of choosing a prosthesis diameter > annulus diameter by MSCT should eliminate the risk of severe/massive AR and drastically reduce the risk of moderate AR.

TCT-785

Is 'Porcelain Aorta' a real Contraindication for Transaortic Transcatheter Aortic Valve Replacement?

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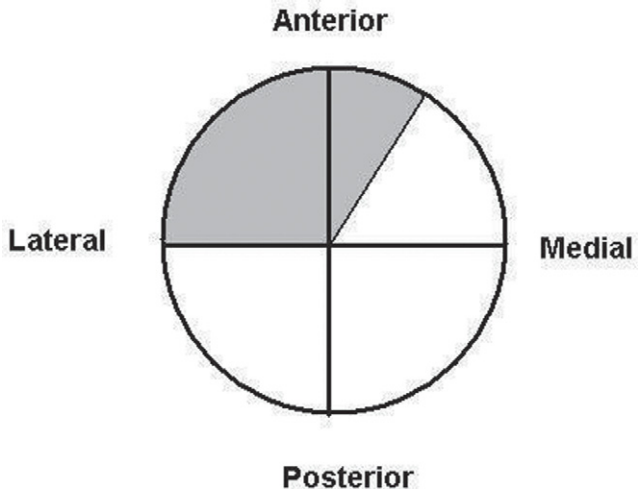
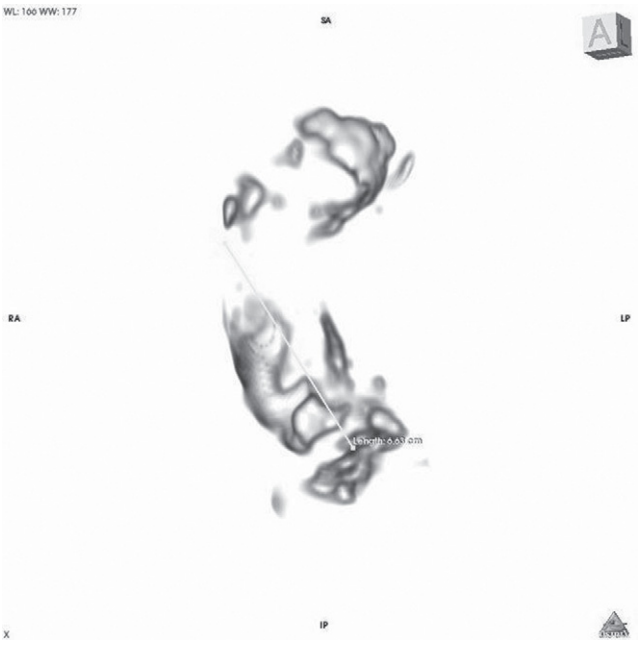
Background: Tansaortic (TAo) approach is another emerging approach for implantation of the Edwards Sapien transcatheter valve through a partial upper sternotomy. 'Porcelain aorta' is often considered a contraindication for this approach. TAo procedure requires a relatively small calcium free area in the distal ascending aorta ≥5 centimeters from the aortic annulus-'TAo zone' (Figure 1). Hence conventional definition of 'Porcelain aorta' may not apply to TAo approach.
Methods: 212 patients (11 Porcelain aorta) underwent TAVR in our institution till June 2011. The CT scans were retrospectively analyzed with 3-D reconstruction for distribution of calcium in the ascending aorta using FDA approved Osirix software with special attention to the 'TAo zone' (Figure 2).
Results: 211 Patients including 10 Porcelain aorta patients had a calcium free 'TAo zone' in the ascending aorta. Only one patient with diffuse distribution of calcium would be a contraindication for this procedure.3/10 underwent TAo procedure with no TIA or stroke postoperatively. 3-D reconstruction data correlated very well with the operative findings.



'TAo Zone' in the distal ascending aorta



3-D reconstruction demonstrates 'TAo zone' free of calcium in a patient identified as porcelain aorta

Conclusion: Conventional definition of Porcelain aorta should not be considered a contraindication for performing a Transaortic procedure.

TCT-786

Beyond the short-term: Clinical Outcome and Valve Performance Two Years after Transcatheter Aortic Valve Implantation in 227 Patients

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Background: Though procedural feasibility of transcatheter aortic valve implantation (TAVI) has been shown by multiple groups, longer-term data are rare. We report on two-year-follow-up clinical and echocardiographic results after TAVI in 227 patients.
Methods: Of 580 non-surgical candidates who underwent TAVI for symptomatic high-grade aortic stenosis, 227 have completed two-year-follow-up. Mean age was 81±7y, 59% were female, mean EuroScore and mean STS score were 21±14% and 7±5%, and

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